

What Good is Happiness?

Marc Fleurbaey*, Erik Schokkaert[†], Koen Decancq[‡]

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Abstract

In this paper we examine whether, and how, welfare economics should incorporate some insights from happiness and satisfaction studies. Our main point is that measuring well-being by reported satisfaction levels is less respectful of individuals' judgments about their own lives than the alternative measure in terms of equivalent incomes that we advocate here. We illustrate the differences between the two approaches with data from the Russian Longitudinal Monitoring Survey (RLMS)

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*Université Paris-Descartes, CERSES, LSE and IDEP. Email: marc.fleurbaey@univ-paris5.fr.

[†]Dept of Economics, Katholieke Universiteit Leuven, and CORE, Université catholique de Louvain.

Email: erik.schokkaert@econ.kuleuven.be.

[‡]Dept of Economics, Katholieke Universiteit Leuven

“For nothing is more certain, than that despair has almost the same effect on us with enjoyment, and that we are no sooner acquainted with the impossibility of satisfying any desire, than the desire itself vanishes.”

D. Hume, *A Treatise of Human Nature*

1 Introduction

Happiness studies are shaking the routine of welfare economics. For decades practitioners have been content with the traditional – if contested – tools of cost-benefit analysis, while theorists explored a variety of other approaches (social choice, fair allocation, capability approach), but they all worked within a relative consensus about the view that interpersonal comparisons of utility were deeply problematic. This consensus involved two different ideas, most of the specialists endorsing at least one of them. First, interpersonal comparisons of utility had no sound empirical basis, as argued by the advocates of the ordinal approach such as Robbins and Samuelson. Second, even if interpersonal comparisons of utility could be made, subjective utility was not considered the proper metric for the evaluation of the distribution of social advantages. The critique of welfarism by Sen (1985) was very influential in spreading this normative judgment among economists.

The success of happiness studies has toppled the consensus on the first idea. With the mass of data accumulated on happiness and satisfaction and the development of their econometric exploitation, subjective utility seems more measurable than ever. Truly enough, the possibility to relate happiness and satisfaction to personal characteristics and features of the social and economic environment does not necessarily enable the analyst to evaluate the distribution of happiness, due to individual effects which may mar interpersonal comparisons. But many publications do not stop at this difficulty and

readily compute the average level of happiness or satisfaction for a group of respondents. There are, moreover, good reasons to trust the existence of sufficient regularity in human psychology, so that interpersonal comparisons appear feasible with some data.

These new developments have triggered a revival of welfarism as well. If utility can be measured after all, why not take it as the metric of social welfare, as was advocated by Bentham? Several authors have taken this line (Kahneman et al. 2004b, Layard 2005). On the other hand, none of the recent developments in the field of measurement directly undermine the arguments that were raised against welfarism in the philosophical debates of the previous decades. The fact that something becomes easier to measure does not give any new normative reason to rely on it. So: where should welfare economics go?

Our aim in this paper is to assess whether, and how, the development of happiness studies can be helpful for making progress in welfare economics. In a nutshell, our thesis will be that these data can help us obtain information on individual preferences about the various dimensions of life, in particular the dimensions which are not directly connected to economic activity. But we will argue against the welfarist use of such data on the ground that this is unlikely to respect individual preferences on what makes a good life. Although this line of argument may sound paradoxical at first glance, because welfarism is usually associated with respect for preferences, we will show how a thorough examination of psychological results on satisfaction supports our argument. In particular, economists have hastily identified the answers to happiness questionnaires with “utility”. But “utility” is a Benthamite construct that does not quite fit the richness of human psychology. If welfare economics takes psychology seriously, it cannot go back to Bentham.

This paper belongs to a stream of critical literature which interrogates the implications of happiness studies for welfare economics, and includes Burchardt (2006), Frey and Stutzer (2007), Nussbaum (2007), Schokkaert (2007). Our work has much in common

with these papers, but our line of argument is more formal and, we hope, more precise in the positive part of the proposal.

The paper is structured as follows. Section 2 introduces in more detail the open questions that we want to address in this paper. Section 3 presents the basic concepts and the formal framework of our analysis. Section 4 derives the core argument against welfarism from axioms expressing the requirement to respect individual preferences over the dimensions of life. Sections 5 and 6 then examine how to make use of happiness and satisfaction surveys in order to derive relevant information about individual preferences. Section 7 concludes.

2 Questions and puzzles

Mostly because of its inability to deal with subjective utility, welfare economics has often confined its analysis to material sources of social welfare, with real income as a proxy for individual welfare, and GDP as a proxy for the welfare of nations. There can be no doubt that happiness studies have been very helpful in broadening the ethical scope of welfare evaluation. They stress the importance of status and social relations, the harm done by unemployment or by competitive struggles among individuals, the benefits brought by good health and family ties, and so on. Individual autonomy appears to be a key aspect of satisfaction with one's life, which includes but is much broader than access to material resources. In this light, one must probably admit that National Happiness would be a much more sensible goal of public policy than National Income.

That being said, the criticisms of welfarism stand as convincing as ever, and the data on happiness can be suspected of ignoring relevant aspects of well-being as well as being polluted with irrelevant aspects. Going back to Sen's (1985) critique, one can indeed worry about what Sen calls "physical-condition neglect": utility is only grounded on the

mental attitude of the person, and does not sufficiently take into account her real physical condition. Two examples are particularly illustrative. One is the case of expensive tastes, in which a higher level of aspiration may dampen an individual's satisfaction although this hardly seems a sufficient reason to consider him to be really worse-off. The other is the case of persons who adapt their aspirations to their objective circumstances: "A person who is ill-fed, undernourished, unsheltered and ill can still be high up in the scale of happiness or desire-fulfilment if he or she has learned to have 'realistic' desires and to take pleasure in small mercies" (Sen, 1985, p. 21). In such examples aspirations appear to play too big a role in the reported satisfaction while the real conditions of life are insufficiently recorded. A second important problem identified by Sen is what he calls "valuation neglect". Valuing a life is a reflective activity in a way that "being happy" or "desiring" need not be (Sen, 1985, p. 29). An acceptable approach to well-being should explicitly take into account this valuational activity by the persons themselves. This is a key insight which resonates in recent work in psychology and will be central to our analysis.

The non-welfarist approaches can stand firm on their critique of welfarism, but they are also vulnerable to criticism when it comes to concrete proposals. The objective-list approaches, in which a list of items is proposed for the measurement of well-being, generally tumble on the question of computing a synthetic index in which the various items will be weighted. Any set of weights that does not reflect individuals' views on their own life can be accused of paternalism or perfectionism, of "playing God"¹ and imposing an external definition of the good life. This is famously known as the "index problem", and it is usually considered that it raises a dilemma in which one has to choose

¹Layard (2005) rebuts the adaptation critique by arguing that the alternative is ominous: "If we accept the Marxist idea of "false consciousness", we play God and decide what is good for others, even if they will never feel it to be so." (p. 121)

between welfarism and paternalism.

We will definitely side with those who consider that one must rely on individual preferences in order to weight the various dimensions of life. In fact, no author, even from the non-welfarist circles, claims that preferences should play no role at all. It would certainly be utterly absurd to evaluate individual situations without any connection to human needs and goals. But most non-welfarist authors have abandoned any hope of catering to each and every individual's preferences in the evaluation of his own situation. We do not accept this negative conclusion. Quite the contrary, the central message of this paper will be that *it is in fact possible to respect each individual's preferences without falling back into welfarism*. This means that there is a way out of the dilemma. One can refrain from paternalism without falling back into welfarism. In fact we will even offer an argument against welfarism that is precisely based on the respect of preferences. It is somewhat different from the "physical condition neglect" and the "valuation neglect" criticisms, although it can be viewed as an extension of both.

The intuitive core of our argument is the following. Consider the famous discrepancy between the evolution of satisfaction over time, which is rather stable for most countries in the long run, and the growth of GDP. It is usually interpreted as meaning that income growth, at the national level, does not really improve satisfaction in the long run.² Although this interpretation serves as a powerful (and welcome) tool of propaganda against the materialistic view of social welfare, it sounds exaggerate to claim that people do not really care about material resources. Consider the following thought experiment. Propose to people in the 1960s to double their real income and to have access to mobile phones, internet, low-cost air transport and the rest, in combination with an increase in life expectancy of about ten years. Make sure they understand that it is not their relative

²See Easterlin (1995), Oswald (1997). While this is a long-standing finding in the happiness literature, it is still matter of debate, as suggested by some recent publications, e.g. Stevenson and Wolfers (2008).

standing that will rise but the whole society. Would they not see this perspective as particularly attractive? Symmetrically, ask people living in the 2000s to imagine all of them going back to the standard of living of the 1960s, with the corresponding reduced life expectancy. Would they consider it a minor sacrifice?

The most plausible conjecture is that the former would heartily accept the change while the latter would strongly resist it. One interpretation of such attitudes is that people are mistaken about what really matters to them, about what really affects their satisfaction. We believe that there is some truth in this interpretation, but that it is not the whole story, nor even the main part of the story. Even when one forecasts that, by adapting one's aspirations, one's satisfaction will remain stable in the long run, one can still have definite preferences for a longer and more affluent life. Such preferences are not proved to be mistaken when one comes to adapt to one's current conditions and to consider them as the frame of reference when answering satisfaction questionnaires.³

Here is another example in the same vein. Schkade and Kahneman (1998) have found that in the USA, students living in California and students living in the Midwest have similar levels of satisfaction with their lives, although both declare that someone like them would have a better life in California than in the Midwest. Schkade and Kahneman suggest that such answers could be the result of a "focusing illusion", namely, considering the difference between the two regions makes them think about the climate and overestimate the importance of the weather for their overall satisfaction. However, another possible explanation is that all these students do prefer to be in California, other things equal,

³Another possible interpretation of the stability of satisfaction curves in the long run is that while some aspects have improved (income, life expectancy), others have worsened (social relations, economic risk). If that were the case, then, people should declare indifference to our hypothetical questions if the way of life of the two epochs were described in a sufficiently complete way. We doubt that this would be their answer.

while once they are completely settled in one region this preference cannot appear in their satisfaction levels because they adapt their standards to their current situation, in what Kahneman has called an “aspiration treadmill”.⁴

And here comes our argument: it is precisely when one wants to respect individual preferences that one should *not* use the level of happiness or satisfaction as the measure of well-being. Doing so would lead to the conclusion that, above a relatively low threshold of affluence and comfort, “little matters in the long run” because happiness and satisfaction are quite stable, human beings being able to adapt to many variations in their living conditions. That “little matters” is not a conclusion that the individuals themselves would accept, even knowing about the adaptation phenomenon. People have definite and strong preferences for various aspects of their living conditions and we should seek to respect these preferences, at least when they are well informed.

3 Satisfaction and preferences

The delicate part of our argument is to explain that the level of satisfaction and the preference ranking can fall apart. Modern psychology sides with us, however. Due to the influence of utilitarianism, economists are naturally attracted to the idea that there is a core object that underlies answers to happiness and satisfaction questionnaires, and

⁴Kahneman (2008) explains how he actually hypothesized later on that this was a better explanation of the California-Midwest study. He combined it with the hypothesis that people are really happier in California but have higher standards of happiness when declaring their satisfaction. He no longer believes in this joint hypothesis because more recent studies have shown that happiness is more adaptable than satisfaction, i.e., the “hedonic treadmill” is stronger than the “aspiration treadmill”. It seems to us, however, that these later results do not disprove the existence of an aspiration treadmill. They just suggest that Californians are neither happier nor more satisfied than others. Our main point is that all this is compatible with everyone having a definite preference for being in California.

they call it “utility”. But this is not how psychology sees it.⁵ As is emphasized, e.g., in Diener (1994) and Diener et al. (1999), utility, if there is such a thing, is an irreducibly multidimensional phenomenon. An essential distinction is between affects and cognition. And in addition, affects come in many colors and shapes, with a sharp divide between positive and negative affects.

The distinction between affect and cognition is the key element for our analysis. In the cognitive part of their satisfaction, individuals cast a judgment over their life. This judgment is an active exercise that is made whenever they want to make an assessment of their situation (for instance, when a happiness surveyor asks them to do so). It is not a quantity that stands in their brain permanently. In contrast, affects flow constantly when they are awake. Among them are feelings of pleasure, joy, excitement, pain, sorrow, abatement, love, hate, pride, shame, and so on, most of these items being subdivided into finer categories.

We consider that what should matter for welfare evaluation is the judgment that individuals cast on their life, i.e., the cognitive part of their satisfaction. Their affects are also important, but only inasmuch as the individuals themselves consider them to be important in their life. In order to see the role of judgment in the evaluation of affects, observe that while positive and negative affects can be easily distinguished, it is not always the case that positive affects are welcome and negative affects are shunned. There are bad sources of pleasure; there are also certain sorts of grief that testify to the value of what is lost, certain fears that distinguish courage from recklessness.⁶ Affects themselves are generally influenced by and mixed with judgments,⁷ but they do not comprehend the

⁵J.S. Mill already criticized Bentham’s unitary concept of utility, blaming “the empiricism of one who has had little experience” (quoted in Nussbaum 2008).

⁶This point is made in Nussbaum (2008).

⁷See Kahneman (1999).

global evaluation an individual makes of all the dimensions of life.

The cognitive part of satisfaction does not come in one piece either. In order to analyze it, a model can be helpful. Let f_i denote the vector of “functionings” (Sen 1985) that describes the life of individual i in some a priori relevant dimensions. Theoretically one could retain all dimensions of life in this vector, but more sensibly, if one thinks of applying this analysis, it is convenient to think of the various components of f_i as corresponding to the main factors shown in the happiness studies to matter, or to the main items in the objective lists proposed in the non-welfarist literature. Not surprisingly, these two kinds of lists tend to be quite similar. It is best also to think of f_i as including the affects and feelings that characterize the individual’s subjective states in his life. In contrast, the evaluative judgment that he may cast on his life is not part of f_i — although this judgment may generate affects which are part of f_i . In this respect, we assume that each individual i has an ordering over the vectors of functionings, that reflects his judgment about what makes a life good or bad. We call it the “valuation ordering”, and denote it by R_i . The expression $f_i R_i f'_i$ means that i weakly prefers the life described by f_i to the life described by f'_i . Let $f_i P_i f'_i$ denote strict preference.

To prefer a life to another is not the same thing as having a greater “hedonic score”, i.e., a better balance of positive affects and negative affects, because individuals may have complex views about the relative importance of various affects, and may value other things than affects and feelings in their life. Affects are just subdimensions of life vectors f_i , and one must allow for a great variety of possible valuation orderings of life. It appears rather implausible that individuals would care only about their hedonic subjective states. The literature often recalls the Benthamite argument that happiness is the only thing that is intrinsically valuable because all other valuable things derive their value from

their contribution to happiness.⁸ This argument is a sort of tautology if happiness is understood as the evaluation of one’s life — obviously, a thing is valuable only insofar as it contributes to a good evaluation — but it is unacceptable if happiness is understood as a hedonic state.

To prefer a life to another is, also, not the same thing as being more satisfied in that life, because the satisfaction judgment is not just an ordering of various lives. It also involves the evaluation of one’s life with respect to a frame of reference, in particular certain aspirations. Let A_i denote the vector of variables which determine i ’s frame of reference. From the happiness literature one knows that such variables include in particular the past history of i ’s life and the situation of his group of reference.⁹ The satisfaction level of individual i , denoted σ_i , can then be described as determined by a function

$$\sigma_i = \sigma(f_i, R_i, A_i). \tag{1}$$

For instance, a simple possibility is when satisfaction depends on the comparison between a level of achievement and a level of aspiration. But many other possibilities are allowed by this model.

Finally, there is the answer to a question such as “Taking all things together, how satisfied are you with your life as a whole these days? Are you very satisfied, satisfied, not very satisfied, not at all satisfied?”. We cannot expect individuals to give an answer that is exactly faithful to their true σ_i . Therefore, one can only write the expressed satisfaction, S_i , as determined by a function in which a disturbance term d_i appears:

$$S_i = S(\sigma_i, d_i). \tag{2}$$

⁸This argument is taken up recently in Layard (2005). Diener (1994) attributes it to Aristotle. See, however, Nussbaum (2008) on Aristotle’s conception of happiness.

⁹See in particular Van Praag and Ferrer-i-Carbonell (2007), Clark and Oswald (2002), Clark et al. (2008).

Disturbance comes from the fact that individuals are not given enough time to reflect properly and the fact that their judgment can be tinted by the mood of the day, by the good looks of the surveyor or by their feeling a duty to give a rosy (or a not too rosy) answer. Moreover, some questionnaires make “happiness”, and even current happiness rather than long term satisfaction, a salient feature of the question, and one should expect that this may make answers provide more information about affects than about the cognitive aspect of satisfaction. The fact that happiness and satisfaction questionnaires usually give similar statistical results in the literature suggests that both suffer from an insufficient clarification of the object of the question, leading respondents to give a confused answer mixing affects or cognitive evaluation, possibly in different proportions for different respondents.

Our thesis is that welfare economics should evaluate people’s lives on the basis of their valuation rankings R_i , not their satisfaction σ_i . With this model, it is easy to understand why one’s satisfaction is not necessarily in line with one’s judgment over one’s life. It is indeed possible to have $\sigma(f_i, R_i, A_i) \leq \sigma(f'_i, R_i, A_i)$ even though $f_i P_i f'_i$. This can happen if the adaptation of aspirations overshoots, for instance because the reference group undergoes a better improvement than i . Then the individual feels less satisfied in his new life, even though he considers it better than his former life. This theoretical possibility is perhaps not often obtained in practice. More relevantly, however, the model shows that one should be cautious to interpret stable satisfaction as a quasi indifference. A more plausible understanding of human psychology is that affects and satisfaction judgments tend to oscillate in a small range of “normal” mental functioning,¹⁰ even when individuals have strong preferences about their living conditions. Variations in observed satisfaction reveal a mixture of compensating differences in evaluations and in aspirations.

¹⁰The normal range varies across individuals as a function of personal temperament, which appears to be a key factor of interindividual differences (see Diener 1994, Diener et al. 1999).

One may still ask why we argue for the use of R_i in welfare economics rather than σ_i or the “happiness” affects featuring in f_i . It should now appear clearly that this is a matter of “individual sovereignty” — a term that we prefer over the more traditional but more restricted notion of “consumer sovereignty”. First, we strongly feel that the well-being of individuals should be evaluated on the basis of their (cognitive) view on what is a good life, rather than solely in terms of affects.¹¹ Second, as far as satisfaction judgments are concerned, it appears that people do not seek merely to “be satisfied” by all possible means. According to our model one can “be satisfied” by three means: 1) by achieving one’s goals (f_i); 2) by reducing one’s aspirations (A_i); 3) by adapting one’s preferences (R_i).¹² If we want to respect individual sovereignty, we should focus only on the degree of achievement of people’s goals. Satisfaction levels are not a reliable proxy for it. If a rich life f^{**} is preferred to a poor life f^* by two individuals i and j having the same views about life, $R_i = R_j$, it can happen that $\sigma(f^{**}, R_i, A_i) = \sigma(f^*, R_j, A_j)$ when the rich “suffers”

¹¹An important part of the happiness literature (Kahneman 1999, Kahneman et al. 1997, 2004a,b) has made the interesting point that hedonic states form an “objective” sort of happiness that is not well understood and memorized by the individuals themselves. As a consequence, specific methods are needed to measure it. This literature initially endorsed the Benthamite view that the aggregate quantity of objective happiness should be maximized, in spite of the paradox that this is not what people recall and care about (this objection is raised in Hausman 2007). Kahneman and Krueger (2006) have qualified this view, noting that the happiness data are not so reliable, especially for interpersonal comparisons, because of strong adaptation effects and substantial cultural variations. As a consequence they propose a different index that measures the amount of time that individuals spend in negative mood. This index is less sensitive than average happiness to scaling errors. Diener 2000 also notes that time spent in positive or negative mood is a better predictor of people’s own recording of happiness. Still, these authors, like us, make a clear distinction between affects and judgments of life satisfaction.

¹²Barry (2007) compares an individual who would seek to be satisfied per se — instead of getting what he wants — to a football fan who would support whatever team is most likely to win. What kind of football fan would that be?

from high aspirations whereas the poor has adapted his aspirations to his situation. To conclude that the two lives are equally good because $\sigma_i = \sigma_j$, however, would go against these individuals' own unanimous judgments and would be, in some sense, paternalistic. To return to the example given before: if the students from California and the students from the Midwest both agree that they prefer to live in California than in the Midwest, it is unacceptable to state that the two locations are equally good when satisfaction levels are similar.¹³

We do not claim that the individual valuation orderings are always respectable. Individuals may suffer from imperfect information or be conditioned by questionable social customs. We only claim that *if* there is no reason to attribute flaws to these orderings, they should be respected. And if there are reasons to think that they are flawed, using subjective satisfaction measures as the ultimate criterion is not the best way to launder preferences.

4 From individual sovereignty to equivalence

In the rest of the paper we examine two questions. In this section, we study the implications of individual sovereignty for welfare economics and in particular for defining a proper way of making interpersonal comparisons. In the next sections we explore how to retrieve valuable information about R_i from the happiness surveys.

In order to determine how to make interpersonal comparisons, we will adopt a setting

¹³There is a tradition, coming from Buddhism and Stoicism, which downplays the achievement of one's goals and puts the adaptation of preferences and aspirations to the center stage. This appears to be motivated by the objective of reducing negative affects like anguish and frustration. See, e.g., Kolm (1982). Clearly, this tradition does not embrace "individual sovereignty" as it seeks to alter people's goals.

that is as favorable as possible to the welfarist approach. That is, we will assume that the valuation ordering R_i is perfectly sound and respectable and that S_i , viewed as a function of f_i , is a correct numerical representation of R_i (in particular, the variables A_i and d_i are assumed to be fixed). Let this function be denoted U_i :

$$U_i(f_i) = S(\sigma(f_i, R_i, A_i), d_i). \quad (3)$$

The general problem of interpersonal comparisons consists in finding an ordering over individual situations summarized by the pair $(f_i, U_i(\cdot))$. The vector f_i describes the various dimensions of life and the function $U_i(\cdot)$ measures the corresponding satisfaction possibilities, in a way that is by assumption faithful to R_i , the valuation ordering. To keep notations short, $(f_i, U_i(\cdot))$ be simply be denoted (f_i, U_i) . We will show that the possibilities for making interpersonal comparisons are seriously restricted by the principle of individual sovereignty.

Let the ordering over pairs (f_i, U_i) be denoted \succsim (with strict preference \succ and indifference \sim). Our guiding principle is individual sovereignty: when — as assumed in this section — there is no reason to correct R_i for any flaw, we should respect it. To fix ideas, we assume that there are m dimensions of life and that f_i can take any value in \mathbb{R}_+^m . We also assume that R_i is continuous and that it is weakly monotonic, i.e., that $f_i \geq f'_i$ implies $f_i R_i f'_i$ and $f_i \gg f'_i$ implies $f_i P_i f'_i$. Let \mathcal{U} denote the set of continuous real-valued functions defined on \mathbb{R}_+^m and representing continuous and weakly monotonic orderings. For any given function U_i , let $R(U_i)$ denote the valuation ordering it represents.

The most important and most immediate application of the principle of individual sovereignty is to respect R_i over comparisons concerning only i .

Pareto Principle: For all $i \in N$, all $f_i, f'_i \in \mathbb{R}_+^m$, all $U_i \in \mathcal{U}$, $(f_i, U_i) \succsim (f'_i, U_i)$ if and only if $U_i(f_i) \geq U_i(f'_i)$.

We can extend this principle to comparisons between individuals having identical

preferences.

Same-Preference Principle: For all $i, j \in N$, all $f_i, f_j \in \mathbb{R}_+^m$, all $U_i, U_j \in \mathcal{U}$, if $R(U_i) = R(U_j)$, then $(f_i, U_i) \succcurlyeq (f_j, U_j)$ if and only if $U_i(f_i) \geq U_i(f_j)$.

The Same-Preference Principle logically implies the Pareto Principle. Let j have $U_j = U_i$ and let $f_j = f'_i$. By the Same-Preference Principle, $(f_i, U_i) \succcurlyeq (f_j, U_j)$ if and only if $U_i(f_i) \geq U_i(f_j)$. This also reads: $(f_i, U_i) \succcurlyeq (f'_i, U_i)$ if and only if $U_i(f_i) \geq U_i(f'_i)$, which is the Pareto Principle.

Note that the welfarist ranking — $(f_i, U_i) \succcurlyeq (f_j, U_j)$ if and only if $U_i(f_i) \geq U_j(f_j)$ — respects the Pareto Principle but does *not* respect the Same-Preference Principle. This was precisely the point of the 1960-2000 and California-Midwest examples introduced in Section 2. In our framework, f_i contains the relevant dimensions of life (including happiness affects), and the satisfaction level $U_i(f_i)$ is not a dimension of life, it expresses a judgment over a life.

It is natural to seek to extend the application of the principle of individual sovereignty further for a world in which different individuals may have different preferences. This turns out to be far from trivial, however. Let us start from what seems an obvious idea, which is in line with the examples given before: if two individuals unanimously agree that f_i is “better” than f_j , then society should follow this ordering. More formally, this can be described as:

Consensus Principle: For all $i, j \in N$, all $f_i, f_j \in \mathbb{R}_+^m$, all $U_i, U_j \in \mathcal{U}$, if $U_i(f_i) > U_i(f_j)$ and $U_j(f_i) > U_j(f_j)$ then $(f_i, U_i) \succ (f_j, U_j)$; if $U_i(f_i) \geq U_i(f_j)$ and $U_j(f_i) \geq U_j(f_j)$ then $(f_i, U_i) \succcurlyeq (f_j, U_j)$.

Although this may seem surprising at first sight, the Consensus Principle is impossible to satisfy. Consider the following example. Take $f_i, f_j, f_k \in \mathbb{R}_+^m$ and $U_i, U_j, U_k \in \mathcal{U}$ yielding the configuration of indifference curves displayed in Figure 1. By the Consensus Principle,

$(f_i, U_i) \succ (f_j, U_j) \succ (f_k, U_k) \succ (f_i, U_i)$: we have a cycle.

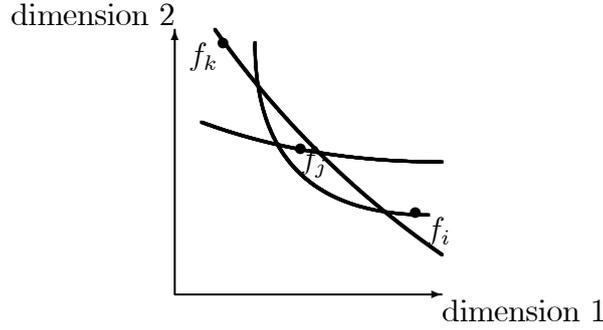


Figure 1: Impossibility of Consensus

Therefore one must add restrictions to the premiss of the axiom in order to make it reasonable. One such restriction consists in requiring the individuals to agree on other vectors than just f_i, f_j . This is done in the following axiom which requires the individuals to agree that all vectors worse than f_j for j are worse than f_i for both individuals, while all vectors better than f_i for i are better than f_j for both.

Agreement Principle: For all $i, j \in N$, all $f_i, f_j \in \mathbb{R}_+^m$, all $U_i, U_j \in \mathcal{U}$, if $U_i(f_i) > U_i(f)$ for all f such that $U_j(f_j) \geq U_j(f)$, and $U_j(f) > U_j(f_j)$ for all f such that $U_i(f) \geq U_i(f_i)$, then $(f_i, U_i) \succ (f_j, U_j)$; if $U_i(f_i) \geq U_i(f)$ for all f such that $U_j(f_j) \geq U_j(f)$, and $U_j(f) \geq U_j(f_j)$ for all f such that $U_i(f) \geq U_i(f_i)$, then $(f_i, U_i) \succcurlyeq (f_j, U_j)$.

This axiom logically implies the Same-Preference Principle. It amounts to imposing that if the indifference curve for (f_i, U_i) everywhere dominates the indifference curve for (f_j, U_j) , then (f_i, U_i) is deemed better than (f_j, U_j) .

Another interesting restriction consists in requiring to have $U(f_i) > U(f_j)$ for all admissible utility functions U (not just for U_i and U_j), which in our case is equivalent to requiring $f_i \gg f_j$. This gives us the following Dominance Principle:¹⁴

¹⁴This axiom corresponds to Sen's (1985) "intersection principle". On this issue, see in particular Brun and Tungodden (2004).

Dominance Principle: For all $i, j \in N$, all $f_i, f_j \in \mathbb{R}_+^m$, all $U_i, U_j \in \mathcal{U}$, if $f_i \gg f_j$ then $(f_i, U_i) \succ (f_j, U_j)$; if $f_i \geq f_j$ then $(f_i, U_i) \succcurlyeq (f_j, U_j)$.

The second part of this axiom implies that for all $f \in \mathbb{R}_+^m$, all $U_i, U_j \in \mathcal{U}$, $(f, U_i) \sim (f, U_j)$. Consequently, U_i plays no role in the evaluation of (f_i, U_i) and this axiom is satisfied only by objective orderings defined by $(f_i, U_i) \succcurlyeq (f_j, U_j)$ if and only if $\tilde{U}(f_i) \geq \tilde{U}(f_j)$, where \tilde{U} is a fixed index. This sort of ordering does not allow for the diversity of individual preferences and does not even respect the Pareto Principle.

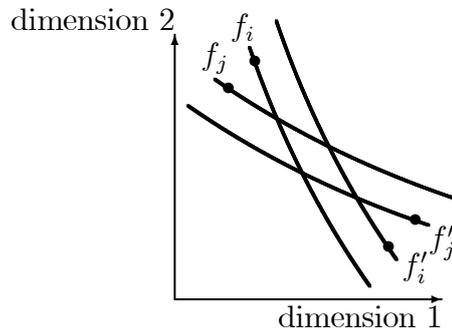


Figure 2: Incompatibility between Dominance and Pareto

Even the first part of the Dominance Principle (i.e., the part involving strict dominance) is incompatible with the Pareto Principle, as shown by the following example. Take $f_i, f_j, f'_i, f'_j \in \mathbb{R}_+^m$ and $U_i, U_j \in \mathcal{U}$ such that $f_i \gg f_j, f'_i \ll f'_j, U_i(f_i) < U_i(f'_i)$, and $U_j(f_j) > U_j(f'_j)$. Figure 2 illustrates this configuration in a two-dimensional case. By monotonicity one has, for $k = i, j$, $U_k(f_i) > U_k(f_j)$ and $U_k(f'_i) < U_k(f'_j)$. The Pareto Principle implies $(f_i, U_i) \prec (f'_i, U_i)$ and $(f_j, U_j) \succ (f'_j, U_j)$ while the first part of Consensus Principle implies $(f_i, U_i) \succ (f_j, U_j)$ and $(f'_i, U_i) \prec (f'_j, U_j)$. By transitivity, one obtains $(f_i, U_i) \prec (f_i, U_i)$, which is impossible.

In virtue of individual sovereignty, we believe that the Pareto Principle, the Same-Preference Principle and the Agreement Principle must be given priority. We can nonetheless seek a weakening of the Dominance Principle that is compatible with them. A rather natural solution consists in restricting the application of the dominance idea to a certain

region of the space. Let F be a given subset of \mathbb{R}_+^m that contains 0, is unbounded, and is arc-connected. We then state:

Subset-Dominance Principle: For all $i, j \in N$, all $f_i, f_j \in F$, all $U_i, U_j \in \mathcal{U}$, if $f_i \gg f_j$ then $(f_i, U_i) \succ (f_j, U_j)$; if $f_i \geq f_j$ then $(f_i, U_i) \succcurlyeq (f_j, U_j)$.

The restriction to a region of the space makes a lot of sense in concrete applications. Consider for instance a simple world with only two functionings, health and wealth. Imagine two individuals such that one has slightly more wealth than the other, but both have a poor health. It is not obvious that the wealthier individual is better-off than the other when it happens that he cares more about health and would be willing to make a great sacrifice of wealth if this could alleviate his health problems. In contrast, when individuals are healthy it appears natural to rank them according to their wealth. This amounts to restricting the application of the Dominance Principle to the region of the space where individuals are healthy. We will see other applications in the next sections.

Let us now derive the consequences of requiring \succcurlyeq to satisfy the Pareto Principle in conjunction with the Subset-Dominance Principle. Let a monotone path be a family $(f_\lambda)_{\lambda \in \mathbb{R}_+}$ such that $\lambda \leq \lambda'$ if and only if $f_\lambda \leq f_{\lambda'}$. An “equivalence” ordering \succcurlyeq is such that there is a monotone path $(f_\lambda)_{\lambda \in \mathbb{R}_+}$ that contains 0, is unbounded and arc-connected, and for which one has $(f_i, U_i) \succcurlyeq (f_j, U_j)$ if and only if $\lambda_i \geq \lambda_j$, where λ_i, λ_j are defined by $U_i(f_i) = U_i(f_{\lambda_i})$ and $U_j(f_j) = U_j(f_{\lambda_j})$.

Proposition 1 *The Pareto-Principle and the Subset-Dominance Principle imply that \succcurlyeq is an equivalence ordering and also satisfies the Same-Preference Principle and the Agreement Principle.*

Proof. Let F denote the subset for which Subset-Dominance is satisfied. Consider two vectors $f, f' \in F$ such that neither $f \geq f'$ nor $f \leq f'$. One can then find $U, U' \in \mathcal{U}$ such that $U(f) > U(f')$ and $U'(f) < U'(f')$. By Pareto, $(f, U) \succ (f', U)$ and $(f, U') \prec (f', U')$.

By Subset-Dominance, $(f, U) \sim (f, U')$ and $(f', U) \sim (f', U')$. By transitivity, one obtains a contradiction. This implies that for all $f, f' \in F$, either $f \geq f'$ or $f \leq f'$. As F is assumed to contain 0, to be unbounded and arc-connected, F is a monotone path in \mathbb{R}_+^m . Let $(f_\lambda)_{\lambda \in \mathbb{R}_+}$ be an indexing of F such that $f_\lambda \geq f_{\lambda'}$ if and only if $\lambda \geq \lambda'$.

Pick any $(f, U) \in \mathbb{R}_+^m \times \mathcal{U}$. By continuity and monotonicity of the valuation orderings, and the fact that F is an unbounded arc-connected monotone path containing 0, there is a unique $f_0 \in F$ such that $U(f_0) = U(f)$. By Pareto, $(f, U) \sim (f_0, U)$. As a consequence, for all $f, f' \in \mathbb{R}_+^m$, all $U, U' \in \mathcal{U}$, one has $(f, U) \succcurlyeq (f', U')$ if and only if $(f_0, U) \succcurlyeq (f'_0, U')$, where $f_0, f'_0 \in F$ are defined by $U(f_0) = U(f)$ and $U'(f'_0) = U'(f')$. This shows that \succcurlyeq is an equivalence ordering, for $(f_\lambda)_{\lambda \in \mathbb{R}_+}$.

That every equivalence ordering satisfies the Same-Preference Principle and the Agreement Principle is easily checked. ■

This result suggests that the equivalence approach strikes a good compromise between the ideal of respecting the diversity of preferences, as embodied in the Pareto, Same-Preference and Agreement Principles, and the dominance idea. It is particularly satisfactory that the stronger Agreement Principle follows from the combination of the Pareto Principle with a dominance axiom.¹⁵

Although an equivalence ordering is a rather specific approach to interpersonal comparisons — in particular, it is not welfarist — the class of equivalence orderings is large. It consists in all orderings which compare pairs (f, U) exclusively in terms of the corresponding indifference sets, and evaluate any given indifference set by the f_λ that it contains. A prominent example in this class is famous in economic theory, namely, the ray utility function, which takes a reference f_0 and computes λ such that $U(f) = U(\lambda f_0)$. This function can be found in many references, e.g., Debreu (1959), Samuelson (1977),

¹⁵A variant of this result involving an equivalence approach defined in terms of opportunity sets can be found in Fleurbaey (2007).

Pazner (1979).¹⁶

Given the great variety of equivalence orderings, one must ask how to go about the choice of the monotone path $(f_\lambda)_{\lambda \in \mathbb{R}_+}$. We do not have a complete theory for this, but the literature offers examples where some foundations for a special choice of path can be obtained by specifying some distributional judgments that are independent of individual preferences. We introduced already the health-wealth case. As an other example, in Maniquet and Sprumont (2004), studying a public good economy with money, a particular path is deduced from the axiom that it is a social improvement to reduce the inequality in money transfers between any agent who contributes and any agent who is subsidized. All recent characterizations of social orderings based on equivalence rankings involve conditions of this sort, i.e., axioms specifying some distributive principle that does not depend on individual preferences.

In the next section, we provide a simple example of how a particular monotone path can be chosen. This is an extension of the health case. In this approach one picks reference values for the various functionings (except income). These reference values are chosen in such a way that it seems ethically acceptable to compare the well-being of the individuals in terms of their income, independently of their preferences, when they are at these reference values. The equivalence idea then implies that one looks for what we will call an equivalent income Y_i^* for each individual i which is such that the individual

¹⁶One can extend the class of equivalence orderings and replace the monotone path by a collection of nested sets. An example is the money-metric utility function, which takes a reference price vector p_0 and computes λ such that the maximum utility attainable with an expenditure equal to λ under the price p_0 is equal to $U(f)$. This function can be found, e.g., in Samuelson (1974). Blackorby and Donaldson (1988) have criticized the money-metric utility function for failing to yield quasi-concave social orderings over allocations, and their criticism can be extended to apply to the ray utility function and similar constructs. The problem, however, disappears when the social aggregation relies on the maximin or leximin criterion, and is substantially alleviated when inequality aversion is put in the social aggregation.

is indifferent between her actual functionings bundle (including her actual income Y_i) and the bundle containing Y_i^* and all the other functionings at their reference levels. Interpersonal comparisons can then be relevantly made with these values Y_i^* .

5 With the data: a first cross-section illustration

We now illustrate how the theoretical proposal in the previous sections can be implemented based on the data from a satisfaction survey. The crucial challenge is to distinguish in the satisfaction (or happiness) answers the part that is due to preferences from the part that is linked to aspiration levels. As soon as the preferences are identified, we can compute the equivalent incomes.

We use the data from the Russia Longitudinal Monitoring Survey (RLMS) for this illustration. These RLMS-data have already been used to analyse happiness and life satisfaction by Frijters et al. (2006), Graham et al. (2004), Ravallion and Lokshin (2001, 2002) and Senik (2004). We introduce the data and show results for the estimation of a standard happiness equation in the first subsection. We then discuss how the theoretical framework from the previous sections can be applied to the Russian data. We finally derive the estimates of the equivalent incomes. In this section, we restrict ourselves to a cross-section analysis. In the next section we will exploit the panel nature of the data to show how one can take account of changes in the aspiration levels in a better way.

5.1 The data: RLMS and life satisfaction in Russia

The Russia Longitudinal Monitoring Survey (RLMS) is a series of nationally representative surveys designed to monitor the effects of Russian reforms on the health and economic welfare of households and individuals in the Russian Federation. These effects are mea-

sured by a variety of means: detailed monitoring of individuals' health status and dietary intake; precise measurement of household-level expenditures and service utilization; and collection of relevant community-level data, including region-specific prices and community infrastructure data. Data have been collected thirteen times since 1992. In this section we analyse the data of round 9, i.e. for the year 2000. We use observations for 5340 individuals in 2646 households.¹⁷

The RLMS is an extremely rich dataset, containing a lot of information on the personal characteristics and the socio-economic circumstances of the individuals. It also contains a typical "satisfaction with life" question, formulated in the following way: "*To what extent are you satisfied with your life in general at the present time?*", with answers on a five point-scale ranging from "fully satisfied" to "not at all satisfied". Figure 3 shows the distribution of the answers on that question: compared to most other life satisfaction studies, a large fraction of the Russian population was "less than satisfied" or "not satisfied" with their life in 2000.

As a starting point, we estimated a typical "happiness equation" as they have appeared in many recent publications. At this stage, we simply use OLS to regress life satisfaction S_i of individual i (measured with the five-point scale) on equivalized expenditures Y_i and a set of explanatory variables X_i — we come back to the interpretation of X_i later in this section. For the computation of equivalized expenditures, we have chosen as equivalence scale the square root of the number of household members. We work at the level of the individuals and correct the standard errors for clustering at the household level. After some experimentation with different specifications of the non-linear relationship between satisfaction and equivalized expenditures, we finally preferred the following

¹⁷In total, wave 9 of the RLMS has observations on 10,976 individuals in 4,006 households. However, we only include in our analysis the individuals for which all relevant variables are available.

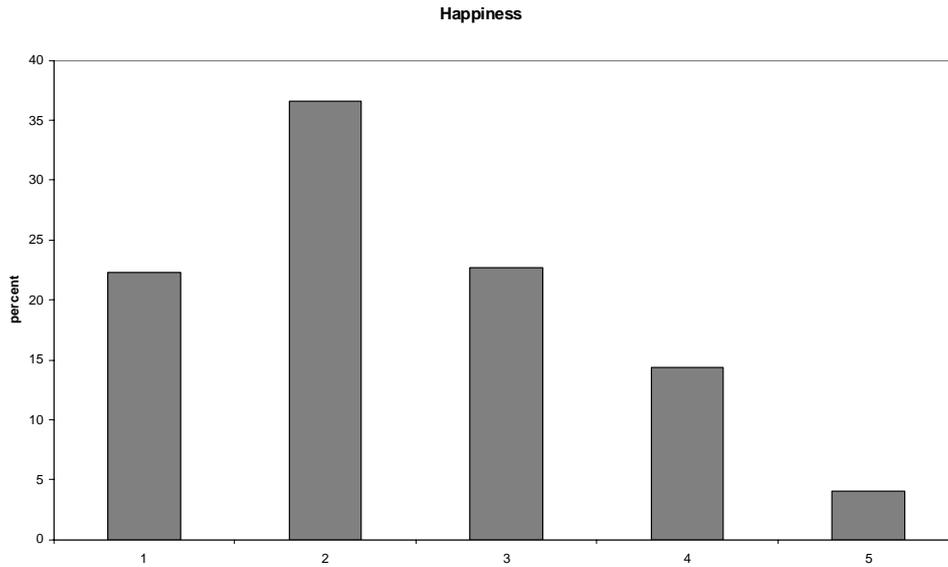


Figure 3: Life satisfaction in Russia (2000)

functional form:

$$S_i = \alpha + \gamma_1 Y_i + \gamma_2 \ln(Y_i) + \delta' X_i + d_i \quad (4)$$

with $(\alpha, \gamma_1, \gamma_2, \delta)$ a vector of coefficients to be estimated. The results of estimating (4) are shown in the first column of Table 1. They are perfectly in line with what is usually found in the literature. Equivalized expenditures, housing and self-assessed health have a highly significant positive effect on life satisfaction¹⁸. Being unemployed has a significantly negative effect. Males are *ceteris paribus* more satisfied than females. We find the usual

¹⁸The RLMS-data contain a lot of information on housing characteristics: space in square metres, availability of central heating, hot water, metered gas, sewerage, telephone, video and computer. They also contain information on the price of the house. We first estimated a hedonic price equation ($R^2 = 0.55$, all variables significant with the correct sign). To correct for household size, we then calculated for each individual an index of the housing quality as the value predicted by the hedonic equation after having substituted "equivalized space" for "space". More information about the estimation procedure and the results is available from the authors on request.

U-shaped pattern with respect to age, with the minimum level of life satisfaction reached in the age range 40-49 years. Being married or living as a married couple increases life satisfaction. Being a member of a minority group (i.e. having a non-Russian nationality) has a positive effect (at the 0.05 level). Education has no significant effect and the same is true for being religious. However, there are differences between the different religions — with the buddhists and the hindus significantly more satisfied than the other creeds. Nothing of this is surprising: these are basically the regularities that are found in most of the "happiness literature". The question now is: how to proceed from here?

5.2 Quality of life dimensions and satisfaction with life

We can link our typical happiness-equation (4) to the equations (1) and (2) in section 3. This comparison shows that the vector of explanatory variables X_i contains both indicators of f_i (the dimensions of the life or the functionings of individual i) and variables measuring personal characteristics of i , that are related to interindividual differences in their frame of reference A_i and in their preferences R_i . Differences in the frame of reference (the aspiration levels) should not play a role in the overall evaluation of the living standard, differences in preferences should be respected. Therefore, to proceed we have to think explicitly about the interpretation of the different variables in the vector X_i .

The first and most important decision is the definition of the vector of relevant life dimensions. Many different lists of functionings have been proposed in the literature. They are to a large extent overlapping, however. As a matter of fact, everybody agrees that material welfare (in our equation captured by Y_i) is relevant. Moreover, our vector X_i contains some of the other most important items, appearing in all of these lists: health, housing and employment. The latter variable is captured in a minimal way in our estimation, since the only indicator used is "being unemployed". It would certainly

Table 1: Estimation Results

	(Model 1)		(Model 2)	
	coefficient	Std. Err.	coefficient	Std. Err.
expenditure	0.00000669*	0.00000342	0.00000659*	0.00000342
log (expenditure)	0.216***	0.0289	0.217***	0.0289
health	0.242***	0.0232	0.276***	0.0352
house	0.00000174***	0.000000312	0.00000173***	0.000000312
unemployed	-0.270***	0.0536	0.007	0.115
gender	0.0784***	0.0285	0.0791***	0.0285
householdsize	-0.00512	0.0123	-0.00420	0.0122
age_90	0.169	0.308	-0.447	0.340
age_80	0.0112	0.145	-0.592***	0.198
age_70	-0.265***	0.0988	-0.873***	0.168
age_60	-0.429***	0.0885	-1.054***	0.165
age_50	-0.488***	0.0869	-1.132***	0.168
age_40	-0.641***	0.0791	-1.302***	0.165
age_30	-0.501***	0.0790	-0.532***	0.0791
age_20	-0.279***	0.0696	-0.300***	0.069
higher education	-0.0586	0.0375	-0.323***	0.124
married	0.227***	0.0619	0.219***	0.0617
as married	0.311***	0.0847	0.297***	0.0847
divorced	0.0488	0.0746	0.0455	0.0744
widowed	0.0741	0.0764	0.0675	0.0760
religious	0.0623	0.0393	0.0613	0.0393
orthodoxy	-0.235	0.175	-0.247	0.177
catholicism	0.0918	0.260	0.074	0.261
protestantism	0.384	0.360	0.330	0.363
islam	-0.234	0.200	-0.245	0.202
judaism	-0.334	0.239	-0.351	0.235
buddhism	1.626***	0.436	1.555***	0.457
hindu	0.723***	0.205	0.720***	0.208
minority	0.145**	0.0610	0.142**	0.0607
jogged	0.149**	0.0755	0.167**	0.0752
young*health			-0.198***	0.0431
higher educ*health			0.0922**	0.0395
higher educ*unempl			-0.344***	0.126
constant	-0.144	0.331	-0.412	0.362
R^2 ($N = 5340$)	0.221		0.226	

Regional effects are included, but not shown; * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

have been preferable to include richer information about the job characteristics of the individuals, but these are not available in our data. Yet, we can feel rather safe — and we are in line with most of the previous literature — if we partition the vector X_i as (F_i, Z_i) , where F_i contains the relevant dimensions of life apart from material welfare (i.e. health, housing, unemployment) and all the other variables are in Z_i and are interpreted as conditioning variables. The latter will influence the frame of reference of the individuals — or lead to differences in preferences.

Two remarks are important here. First, while it is an essential step in our approach, the distinction between life dimensions and conditioning variables is not as clear-cut as it may seem. To give an example: implicitly, we have taken being religious or not, and personal family situation (being married, divorced, as married or widowed) as conditioning variables and not as dimensions of life that should be taken into account in the evaluation of living standards. Certainly in the latter case, one could take the opposite view and argue that "having harmonious personal relations" is a crucial feature of a good life. In our view, ultimately this boils down to an ethical question. We are looking for a concept of well-being that is useful for policy analysis. More specifically it should be of help in evaluating the desirability of redistributive policies. For this purpose, it seems reasonable to focus on the dimensions of life that are at the center of the attention of public policies, and to compare individual situations in these dimensions, at the exclusion of the life dimensions which are in the private sphere.¹⁹

Second, life dimensions will only play a role if they have an effect on satisfaction with life, as revealed in the surveys (see eqs. (1) and (2)). Remember that we argued that it would indeed be absurd to evaluate individual situations without connection to human needs and goals, as they are conceived by the individuals themselves. While this

¹⁹This is only a first step, and in some cases a more extensive analysis is defensible, e.g. if social circumstances make it impossible for individuals to have a normal family life.

is clear in principle, it also raises some tricky issues. Consider the variable "education": sometimes level of education appears as such in lists of relevant dimensions of life, or, it is at least closely related to proposed functionings (or capabilities).²⁰ It turns out to have a negative (but insignificant) effect in our estimation and we did not include it in our list of life dimensions. However, it is possible that education is a true life dimension (i.e. that individuals prefer higher education), but at the same time also influences the frame of reference. It is impossible to distinguish these two effects in our cross-section analysis. We will be able to say more about this problem when we exploit the panel nature of the data in the following section.

When interpreted in terms of preferences and frames of reference, the limitations of the simple specification (4) become immediately clear. While it allows (for good reasons) for a non-linear relationship between equivalized expenditures and satisfaction with life, eq. (4) imposes that the preferences of different subgroups of the population are basically the same. A change in one of the conditioning variables will only shift the level of satisfaction upwards or downwards, without changing the marginal rates of substitution. Remember that such upwards and downwards shifts (leaving the indifference curves the same) are interpreted in our theoretical framework as changes in aspiration levels. It seems more realistic that different individuals (or groups of individuals) also have different preferences. To capture such differences we need a more flexible functional form.

The easiest way to introduce more flexibility in the specification is the inclusion of interaction effects. We therefore have experimented with the following (general) functional form:

$$S_i = \alpha + \gamma_1 Y_i + \gamma_2 \ln(Y_i) + (\vartheta + \lambda' Z_i)' F_i + \delta' Z_i + d_i \quad (5)$$

²⁰To give an example: one of the capabilities on Nussbaum (2000)'s list is "being able to think and reason in a way informed and cultivated by an adequate education".

This expression contains a large amount of independent variables. We therefore simplified the model by keeping only the significant interactions which had a convenient theoretical interpretation. The resulting estimates are shown in the second column of Table 1. We observe that the preferences are different for the young and the old and for the highly educated and the non-highly educated. Health has a stronger effect on the life satisfaction of older and more highly educated respondents. Moreover, the negative effect of unemployment is very strong for the highly educated (and becomes insignificant for the others). All these results stand to reason.

We can illustrate the working of the model with the indifference curves that are implied by it. Some examples are shown in Figure 4 and 5. Figure 3 compares the indifference map in the health-expenditures space for young and old Russians without higher education. The larger weight of health in the preferences of the old is immediately clear. Figure 4 in addition introduces the distinction between highly and non-highly educated respondents: note the very steep curve for the highly educated elderly.

5.3 Results: equivalent incomes and life satisfaction

In the previous subsection we have shown how one can start from estimations of the happiness equation to derive information about the preferences of the individuals - and how one can approach the issue of preference differences. The indifference curves in Figure 4 represent the preferences R_i . The conditioning variables Z_i play two roles. First, they influence the marginal rates of substitution between different functionings. This preference effect has to be taken up in the welfare evaluation. Second, they have a direct effect on welfare - this is interpreted as being linked to differences in the frame of reference. A welfarist approach would take up this latter effect in the evaluation of the welfare of individual i , but we do not. The same is true for the disturbance term d_i , which we also

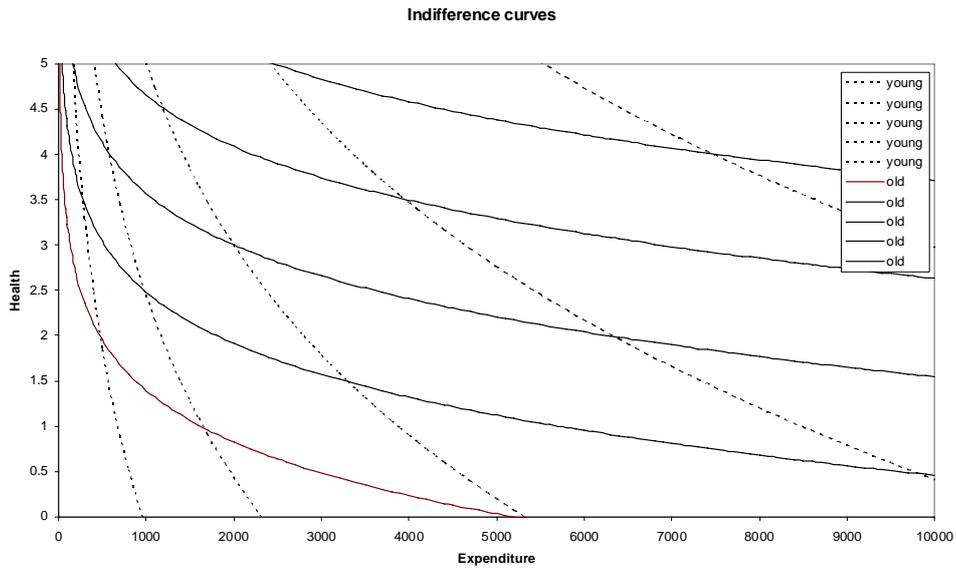


Figure 4: Indifference curves implied by model (5) of a young and old Russian without higher education.

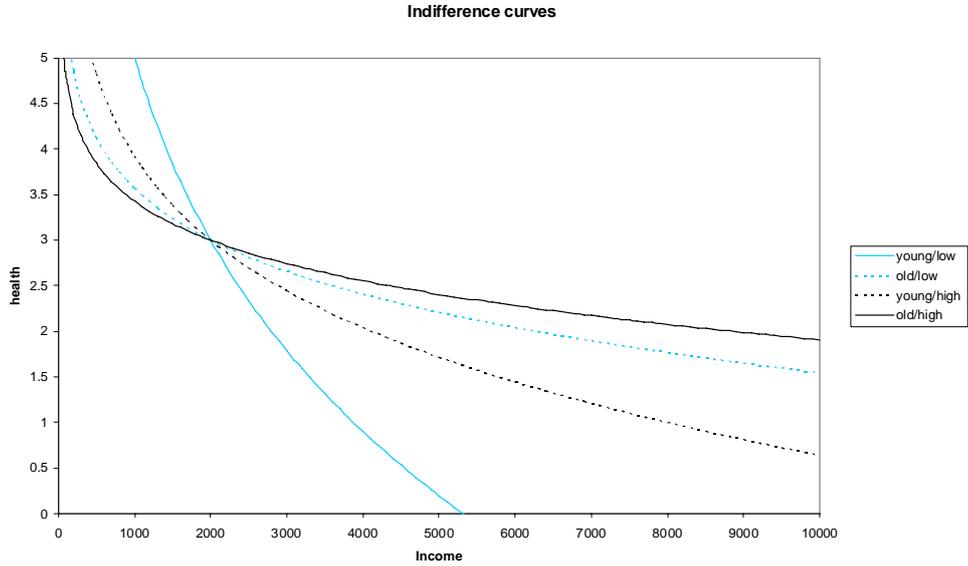


Figure 5: Indifference curves implied by model (5) of a young, low educated; old low educated; young highly educated and old highly educated Russian.

interpret as linked to the frame of reference.

Let us now apply the ideas from the previous section to derive an overall indicator of the quality of life for the individuals in our sample. We first have to choose a monotone path (f_λ) , which will allow us to derive a relevant equivalence ordering. The most straightforward way to do so is to pick reference values for all the dimensions of life, except material welfare. Let us denote these reference values for the life dimensions by \bar{F} . We can then calculate the “equivalent income” Y_i^* : this is the level of equalized expenditures that makes individual i indifferent between the bundle of functionings (Y_i^*, \bar{F}) and his actual bundle (Y_i, F_i) . We will then say that the situation of individual i is better than the situation of individual j if $Y_i^* \geq Y_j^*$.

There still remains the crucial question of the choice of the reference values \bar{F} . This is ultimately an ethical choice: we have to fix the reference values in such a way that they lead to acceptable distributional judgments. This raises deep issues, but for our illustrative purposes, we propose the following choices:

- as argued before, for *health* it is natural to take perfect health as the reference. If two individuals are equally healthy, we can rank their quality of life on the basis of their material welfare.
- a similar argument can be put forward with respect to *employment*: here also we choose as reference value the best possible situation, i.e. not being unemployed. This means that "not being unemployed" is the natural social reference point for a comparison of well-being, in that if two individuals are employed we can rank them on the basis of their expenditures only. It would be strange to compensate one of the two if she claims that she cares less than the other about being employed.²¹

²¹With the proviso mentioned before that our data do not allow us to include a rich set of job characteristics.

However, take two unemployed individuals with a different income. In that case it makes sense to check if one of the two suffers more from the social and psychological stigma related to unemployment, implying that a ranking in terms of expenditures would not suffice. Note that we are not taking a position on psychological feelings of happiness here, our aim being to respect individual preferences and views about the importance of life dimensions.

- *housing* raises more difficult issues, because it is not obvious what is the natural point of reference. In our empirical work, we will use the median value of housing.

With the values for \bar{F} fixed in this way, we can immediately calculate for each individual her equivalent income Y_i^* by solving the following implicit equation:

$$\gamma_1 Y_i^* + \gamma_2 \ln(Y_i^*) + (\vartheta + \lambda' Z_i)' \bar{F} = \gamma_1 Y_i + \gamma_2 \ln(Y_i) + (\vartheta + \lambda' Z_i)' F_i \quad (6)$$

Note that the conditioning variables Z_i only appear in eq. (6) in so far as they influence the preferences of different individuals — the direct effects on the level of satisfaction (captured by δ in eq. (5)) are considered as irrelevant for the welfare evaluation. The same is true for the idiosyncratic disturbance term d_i . Solving eq. (6) for all individuals gives a complete vector with the equivalent incomes of all individuals in the sample.

It is instructive to compare the results of our approach with three alternative approaches to measuring welfare. The first is using equivalized expenditures as such, i.e. considering only material welfare. This is probably still the most common approach in applied work, partly because of the operational difficulties in implementing ethically richer and more attractive approaches. The second is the welfarist alternative, which has gained so much popularity since it has become feasible to measure subjective satisfaction (and/or happiness) with survey questions. The third is self-assessed health. This is added mainly for comparison purposes, although it is interesting on its own, because it

is very often used as the single indicator in the work on equity in health.²². Tables 2-4 show the cross-tabulations of Y_i^* with equivalized expenditures Y_i , subjective satisfaction S_i and self-assessed health respectively. Table 5 summarizes this information in terms of Spearman rank coefficients. It is obvious that the different concepts lead to different rankings. Both the cross-tabulations and the Spearman rank correlation coefficients show that equivalent incomes are far from perfectly correlated with health and with equivalized expenditures. And the correlation with subjective satisfaction is even very low.

Table 2: Cross-tabulation of Y_i^* and equivalized expenditures.

equivalized expenditure	10 quantiles of Y_i^*										total
	1	2	3	4	5	6	7	8	9	10	
1	284	137	90	76	90	36	20	3	3	0	739
2	155	174	105	84	81	119	50	19	0	0	787
3	122	137	117	75	80	93	98	49	19	0	790
4	61	87	128	93	89	77	111	96	33	5	780
5	47	62	111	118	72	100	114	89	67	14	794
6	53	68	96	88	64	100	75	122	82	32	780
7	29	42	63	106	92	69	81	135	150	46	813
8	21	36	42	77	111	69	86	104	156	86	788
9	9	33	22	45	78	77	67	103	156	198	788
10	4	8	12	21	29	43	83	64	119	403	786
total	785	784	786	783	786	783	785	784	785	784	7845

We give some further information about the differences between the different approaches in Table 6. This table sketches a portrait of the individuals in the lowest quintile of the distributions for the different welfare concepts. Who is considered to be deprived? The differences between the results for the welfarist satisfaction measure and our equivalent incomes are especially striking. The least satisfied individuals have much larger

²²Fleurbaey and Schokkaert (2007) argue that an evaluation of equity in self-assessed health requires considering the whole vector of life dimensions and propose an approach in terms of equivalent incomes.

Table 3: Cross-tabulation of Y_i^* and subjective satisfaction

subjective satisfaction	10 quantiles of Y_i^*										total
	1	2	3	4	5	6	7	8	9	10	
1	363	247	212	164	180	155	140	103	88	63	1715
2	266	326	340	358	294	317	268	261	240	207	2877
3	89	122	148	162	187	180	205	232	220	198	1743
4	44	67	70	75	90	104	137	145	175	227	1134
5	9	14	9	16	27	21	27	34	57	83	297
total	771	776	779	775	778	777	777	775	780	778	7766

Table 4: Cross-tabulation of Y_i^* and self-assessed health

Health	10 quantiles of Y_i^*										total
	1	2	3	4	5	6	7	8	9	10	
1	188	33	6	3	2	3	0	1	0	0	236
2	398	334	132	79	40	31	26	22	13	17	1092
3	194	395	602	642	600	518	436	371	271	238	4267
4	5	22	46	56	138	214	310	367	453	441	2052
5	0	0	0	3	6	17	13	23	48	88	198
total	785	784	786	783	786	783	785	784	785	784	7845

Table 5: Spearman rank correlation between the welfare concepts

	equi. expenditures	Y_i^*	health	satisfaction
equi. expenditure	1			
Y_i^*	0.5932	1		
health	0.1227	0.6394	1	
satisfaction	0.2323	0.3312	0.2155	1

expenditures, a better health and a nicer house than those with the lowest value of equivalent incomes. Moreover, the proportion of unemployed is slightly lower among the least satisfied. Clearly, subjective satisfaction does not capture deprivation on the dimensions of life. The larger correlation between equivalized expenditures and our concept of well-being also shows up in this table. The main difference is with respect to health: health is valued strongly in our well-being concept, certainly for a large fraction of (educated and older) people. This effect is of course not taken up in equivalized expenditures. The same is true (to a much smaller extent) for the non-monetary cost of being unemployed. Table 6 clearly shows that the choice of concept used for interpersonal comparisons does indeed matter - and we have the impression that our well-being concept gives quite reasonable results.

Table 6: Portrait of lowest quintile of different welfare concepts

	equi. expenditures	Y_i^*	satisfaction
expenditure	1088	2096	3409
Y_i^*	187	31	762
health	2.96	2.26	2.85
happiness	2.02	1.93	1
house	64056	64722	75131
unemployed	12.9%	14.4%	14.2%
male	39.8%	35.6%	40.4%
householdsize	3.09	2.73	3.22
age	48	60	47
higher education	55.3%	61.1%	64.4%
married	43.3%	51.0%	51.1%
as married	10.1%	8.2%	8.3%
divorced	8.7%	8.5%	8.5%
widowed	19.8%	27.7%	16.8%
religious	72.3%	75.0%	71.8%
minority	14.4%	13.1%	14.4%

6 With the data: adaptation and aspiration levels

In the previous section we restricted ourselves to an analysis of the cross-section data of one wave of the RLMS. Exploiting the panel nature of the data, however, makes it possible to tackle the crucial problem of adaptation of aspiration levels in a more adequate way (Burchardt, 2005; Frijters et al., 2006). This does not in the least change our basic theoretical structure, but it allows for a more refined way of distinguishing differences in preferences from changes in the frame of reference. This section of the paper will be finished in the near future.

7 Conclusion

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